

### **AMENDMENTS TO SPECIFICATION**

**Replace the paragraph at page 1, lines 3-4, with the following:**

This application is a divisional of U.S. Application No. 09/424,978, filed December 2, 1999, now granted as U.S. Patent No. 6,664,445, which is a National Stage Application of PCT/US98/11692, filed June 5, 1998, which claims the benefit of U.S. Provisional Application No. 60/048,771, filed June 6, 1997, and U.S. Provisional Application No. 60/049,443, filed June 12, 1997.

**Replace the paragraphs beginning at page 3, line 35, and ending at page 4, line 19, with the following:**

Figures 3A and 3B show ~~Figure 3 shows~~ a multiple alignment of the amino acid sequence fragments reported herein encoding diaminopimelate epimerase (SEQ ID NOs:7, 9, 11, and 13) and the *Synechocystis sp.* diaminopimelate epimerase sequence set forth in DDBJ Accession No. D90917 (SEQ ID NO:14).

Figures 4A, 4B and 4C show ~~Figure 4 shows~~ a multiple alignment of the amino acid sequence fragments reported herein encoding threonine synthase (SEQ ID NOs:16, 18, 20, 22, 24, and 26) and the *Arabidopsis thaliana* threonine synthase sequence set forth in GenBank Accession No. L41666 (SEQ ID NO:27).

Figures 5A and 5B show ~~Figure 5 shows~~ a multiple alignment of the amino acid sequence fragments reported herein encoding threonine deaminase (SEQ ID NOs:29, 31, and 33) to the *Brukholderia capacia* threonine synthase set forth in GenBank Accession No. U40630 (SEQ ID NO:34).

Figures 6A, 6B and 6C show ~~Figure 6 shows~~ the nucleotide sequence alignment of the S-adenosylmethionine synthetase reported herein for corn (SEQ ID NO:35) with the *Oryza sativa* S-adenosylmethionine synthetase nucleotide sequence set forth in EMBL Accession No. Z26867 (SEQ ID NO:37).

Figures 7A, 7B and 7C show ~~Figure 7 shows~~ the nucleotide sequence alignment of the S-adenosylmethionine synthetase reported here for soybean (SEQ ID NO:38) with the *Lycopersicon esculentum* S-adenosyl-methionine synthetase nucleotide sequence set forth in EMBL Accession No. Z24741 (SEQ ID NO:40).

Figures 8A, 8B and 8C show ~~Figure 8 shows~~ the nucleotide sequence alignment of the S-adenosylmethionine synthetase reported here for wheat (SEQ ID NO:41) with the *Hordeum vulgare* S-adenosylmethionine synthetase nucleotide sequence set forth in DDBJ Accession No. D63835 (SEQ ID NO:43).

**Replace the paragraph at page 8, lines 16-38, with the following:**

A "substantial portion" of an amino acid or nucleotide sequence comprises enough of the amino acid sequence of a polypeptide or the nucleotide sequence of a gene to afford putative identification of that polypeptide or gene, either by manual evaluation of the sequence by one skilled in the art, or by computer-automated sequence comparison and identification using algorithms such as BLAST (Basic Local Alignment Search Tool; Altschul, S. F., et al., (1993) *J. Mol. Biol.* 215:403-410; ~~see also [www.ncbi.nlm.nih.gov/BLAST/](http://www.ncbi.nlm.nih.gov/BLAST/)~~). In general, a sequence of ten or more contiguous amino acids or thirty or more nucleotides is necessary in order to putatively identify a polypeptide or nucleic acid sequence as homologous to a known protein or gene. Moreover, with respect to nucleotide sequences, gene specific oligonucleotide probes comprising 20-30 contiguous nucleotides may be used in sequence-dependent methods of gene identification (e.g., Southern hybridization) and isolation (e.g., *in situ* hybridization of bacterial colonies or bacteriophage plaques). In addition, short oligonucleotides of 12-15 bases may be used as amplification primers in PCR in order to obtain a particular nucleic acid fragment comprising the primers. Accordingly, a "substantial portion" of a nucleotide sequence comprises enough of the sequence to afford specific identification and/or isolation of a nucleic acid fragment comprising the sequence. The instant specification teaches partial or complete amino acid and nucleotide sequences encoding one or more particular plant proteins. The skilled artisan, having the benefit of the sequences as reported herein, may now use all or a substantial portion of the disclosed sequences for purposes known to those skilled in this art. Accordingly, the instant invention comprises the complete sequences as reported in the accompanying Sequence Listing, as well as substantial portions of those sequences as defined above.

**Replace the paragraph at page 19, lines 18-34, with the following:**

ESTs encoding plant amino acid biosynthetic enzymes were identified by conducting BLAST (Basic Local Alignment Search Tool; Altschul, S. F., et al., (1993) *J. Mol. Biol.* 215:403-410; ~~see also [www.ncbi.nlm.nih.gov/BLAST/](http://www.ncbi.nlm.nih.gov/BLAST/)~~) searches for similarity to sequences contained in the BLAST "nr" database (comprising all non-redundant GenBank CDS translations, sequences derived from the 3-dimensional structure Brookhaven Protein Data Bank, the last major release of the SWISS-PROT protein sequence database, EMBL, and DDBJ databases). The cDNA sequences obtained in Example 1 were analyzed for similarity to all publicly available DNA sequences contained in the "nr" database using the BLASTN algorithm provided by the National Center for Biotechnology Information (NCBI). The DNA sequences

were translated in all reading frames and compared for similarity to all publicly available protein sequences contained in the "nr" database using the BLASTX algorithm (Gish, W. and States, D. J. (1993) *Nature Genetics* 3:266-272) provided by the NCBI. For convenience, the P-value (probability) of observing a match of a cDNA sequence to a sequence contained in the searched databases merely by chance as calculated by BLAST are reported herein as "pLog" values, which represent the negative of the logarithm of the reported P-value. Accordingly, the greater the pLog value, the greater the likelihood that the cDNA sequence and the BLAST "hit" represent homologous proteins.

**Replace the paragraph at page 21, lines 5-21, with the following:**

The sequence of the entire cDNA insert in clone chp2.pk0008.h4 was determined and is shown in SEQ ID NO:6; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:7. The amino acid sequence set forth in SEQ ID NO:7 was evaluated by BLASTP, yielding a pLog value of 75.66 versus the *Synechocystis* sp. sequence. The sequence of a portion of the cDNA insert from clone rls48.pk0036.h10 is shown in SEQ ID NO:8; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:9. The nucleotide sequence of the contig assembled from clones se2.pk0005.f1, ses8w.pk0010.h11, sfl1.pk0031.h3, and sgs1c.pk002.k12 was determined and is shown in SEQ ID NO:10; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:11. The amino acid sequence set forth in SEQ ID NO:11 was evaluated by BLASTP, yielding a pLog value of 98.57 versus the *Synechocystis* sp. sequence. The sequence of a portion of the cDNA insert from clone wlm24.pk0030.g4 is shown in SEQ ID NO:12; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:13. Figures 3A and 3B present ~~Figure 3 presents~~ an alignment of the amino acid sequences set forth in SEQ ID NOs:7, 9, 11, and 13 and the *Synechocystis* sp. sequence (SEQ ID NO:14). The data in Table 4 represents a calculation of the percent identity of the amino acid sequences set forth in SEQ ID NOs: 7, 9, 11, and 13 and the *Synechocystis* sp. sequence.

**Replace the paragraph at page 23, lines 5-26, with the following:**

The sequence of the entire cDNA insert in clone cc2.pk0031.c9 was determined and is shown in SEQ ID NO:15; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:16. The amino acid sequence set forth in SEQ ID NO:16 was evaluated by BLASTP, yielding a pLog value of 166.11 versus the *Arabidopsis thaliana* sequence. BLASTN against dbest indicated identity of nucleotides 520 through 684 from cc2.pk0031.c9 with nucleotides 1 through 162 of a corn EST

(GenBank Accession No. T18847). The sequence of a portion of the cDNA insert from clone cs1.pk0058.g5 is shown in SEQ ID NO:17; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:18. The sequence of a portion of the cDNA insert from clone rls72.pk0018.e7 is shown in SEQ ID NO:19; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:20. The sequence of a portion of the cDNA insert from clone se1.06a03 is shown in SEQ ID NO:21; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:22. The sequence of the entire cDNA insert in clone sr1.pk0003.f6 was determined and is shown in SEQ ID NO:23; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:24. The amino acid sequence set forth in SEQ ID NO:24 was evaluated by BLASTP, yielding a pLog value of 275.06 versus the *Arabidopsis thaliana* sequence. The sequence of a portion of the cDNA insert from clone wr1.pk0085.h2 is shown in SEQ ID NO:25; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:26. Figures 4A, 4B and 4C present ~~Figure 4 presents~~ an alignment of the amino acid sequences set forth in SEQ ID NOs:16, 18, 20, 22, 24, and 26 and the *Arabidopsis thaliana* sequence. The data in Table 6 represents a calculation of the percent identity of the amino acid sequences set forth in SEQ ID NOs:16, 18, 20, 22, 24, and 26 and the *Arabidopsis thaliana* sequence (SEQ ID NO:27).

**Replace the paragraph beginning at page 24, line 28, and ending at page 25, line 10, with the following:**

The sequence of the entire cDNA insert in clone cen1.pk0064.f4 was determined and is shown in SEQ ID NO:28; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:29. The amino acid sequence set forth in SEQ ID NO:29 was evaluated by BLASTP, yielding a pLog value of 134.85 versus the *Brukholderia capacia* sequence. The sequence of a portion of the cDNA insert from clone sfl1.pk0055.h7 is shown in SEQ ID NO:30; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:31. The sequence of the entire cDNA insert in clone sre.pk0044.f3 was determined and is shown in SEQ ID NO:32; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:33. The amino acid sequence set forth in SEQ ID NO:33 was evaluated by BLASTP, yielding pLog values of 19.24 ~~49.24~~ versus the *Solanum tuberosum* sequence and 15.19 ~~45.19~~ versus the *Brukholderia capacia* threonine deaminase sequence. Figures 5A and 5B present ~~Figure 5 presents~~ an alignment of the amino acid sequences set forth in SEQ ID NOs:29, 31, and 33 and the *Brukholderia capacia* (SEQ ID NO:34) sequence. The data in Table 7 represents a calculation of the percent identity of the amino acid sequences set forth in SEQ ID NOs:29, 31, and 33 ~~35~~ and the *Brukholderia capacia* sequence.

**Replace the paragraphs beginning at page 25, line 29, and ending at page 26, line 24, with the following:**

The BLASTX search using the nucleotide sequence from clone cc3.mn0002.d2 revealed similarity of the protein encoded by the cDNA to S-adenosylmethionine synthetase from *Oryza sativa* (EMBL Accession No. Z26867; pLog = 99.03). The sequence of the entire cDNA insert in clone cc3.mn0002.d2 was determined and is shown in SEQ ID NO:35; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:36. The nucleotide sequence set forth in SEQ ID NO:35 was evaluated by BLASTN, yielding a pLog value larger than 200 versus the *Oryza sativa* sequence. Figures 6A, 6B and 6C present ~~Figure 6 presents~~ an alignment of the nucleotide sequences set forth in SEQ ID NO:35 and the *Oryza sativa* sequence (SEQ ID NO:37). The nucleotide sequence in SEQ ID NO:35 is 88% identical over 1216 nucleotides to the nucleotide sequence of the *Oryza sativa* S-adenosylmethionine synthetase.

The BLASTX search using the nucleotide sequence from clone s2.12b06 revealed similarity of the protein encoded by the cDNA to S-adenosylmethionine synthetase from *Lycopersicon esculentum* (EMBL Accession No. Z24741; pLog = 62.62). The sequence of the entire cDNA insert in clone s2.12b06 was determined and is shown in SEQ ID NO:38; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:39. The nucleotide sequence set forth in SEQ ID NO:38 was evaluated by BLASTN, yielding a pLog value larger than 200 versus the *Lycopersicon esculentum* sequence. Figures 7A, 7B and 7C present ~~Figure 7 presents~~ an alignment of the nucleotide sequences set forth in SEQ ID NO:38 and the *Lycopersicon esculentum* sequence (SEQ ID NO:40). The nucleotide sequence set forth in SEQ ID NO:38 is 82 % identical over 1210 nucleotides to the *Lycopersicon esculentum* sequence.

The BLASTX search using the nucleotide sequence from the contig assembled from clones wre1.pk0002.c12, wle1n.pk0070.b8, wkm1c.pk0003.g4, wlk1.pk0028.d3, wre1n.pk170.d8, wr1.pk0086.d5, wr1.pk0103.h8, and wre1n.pk0082.b2 revealed similarity of the protein encoded by the contig to S-adenosylmethionine synthetase from *Hordeum vulgare* (DDBJ Accession No. D63835) with a pLog value larger than 200. The nucleotide sequence of the contig assembled from clones wre1.pk0002.c12, wle1n.pk0070.b8, wkm1c.pk0003.g4, wlk1.pk0028.d3, wre1n.pk170.d8, wr1.pk0086.d5, wr1.pk0103.h8, and wre1n.pk0082.b2 is shown in SEQ ID NO:41; the deduced amino acid sequence of this cDNA is shown in SEQ ID NO:42. Figures 8A, 8B and 8C present ~~Figure 8 presents~~ an alignment of the nucleotide sequence set forth in SEQ ID NO:41 and the

*Hordeum vulgare* sequence (SEQ ID NO:43). The SEQ ID NO:41 is 92% identical to the *Hordeum vulgare* sequence.